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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/884,411	06/27/97	EDGE C	436231US01

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EXAMINER	
DASTOURI, M	
ART UNIT	**PAPER NUMBER**
2723	10

DATE MAILED: 05/07/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
08/884,411	Edge et al
Examiner	**Group Art Unit**
Mehrdad Dastouri	2723

☒ Responsive to communication(s) filed on *Mar 15, 1999*

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *Three* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

☒ Claim(s) *1-5, 7-18, 20-23, 25-38, and 41-64* is/are pending in the applicat

Of the above, claim(s) _____ is/are withdrawn from consideration

☒ Claim(s) *63 and 64* is/are allowed.

☒ Claim(s) *1-5, 7-11, 14, 16-18, 20-23, 25-27, 30, 32-38, 41-43, 46, 48-52, 55, and 57-62* is/are rejected.

☒ Claim(s) *12, 13, 15, 28, 29, 31, 44, 45, 47, 53, 54, and 56* is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☒ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____ .

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). *8*

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed, March 15, 1999, has been entered and made of record.

2. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

3. Objection to disclosure has been withdrawn in view of the Applicant's amendment.

4. Applicants' arguments with regards to Claims 1-5, 7-18, 20-23, 25-38, 41-57 have been fully considered but they are not persuasive. Applicant argues in essence that:

4.1 None of Winkelman, Usami et al, and Van de Capelle disclose or suggest a color characterization technique that involves converting first color values into second color values in a device-independent color coordinate system using a first (white) reference vector and a second (black) reference vector, wherein the white reference vector is adjusted using the black reference vector and the first color values.

4.2 The logic in the Examiner's reasoning for the color references disclosed by Winkelman is unclear to Applicants.

The Examiner disagrees and indicates that Winkelman (U.S. Patent 5,668,890) disclose the color characterization technique in the above mentioned Item 4.1 as follows:

a. Figure 18; Column 28, Lines 16-52, white reference vector and black reference vector are clearly identified. These reference vectors will be adjustable based on the transfer function of transmission of the original colors as indicated in Column 28, Lines 31-52.

b. Figure 20; Method Step (a); Columns 29-32. Particularly, in calculation of matrixing coefficients M (Column 31, Lines 40-67, Column 32, Lines 1-41). White references of the desired type, Xn, Yn, Zn, are adjusted based on standard color values achieved for first color values R, G, B.

c. Figures 4-17; Columns 6-28. In particular, Figure 4 shows a luminance histogram of the original image with adjustable dark (black) and light (white) regions with different check points in light and dark region ranges. Adjustment and correction of the reference colors are based on the histogram. Histogram contain and depend light image region and dark image region. Thus, histogram depend on the black and white references and the choices made within light and dark image regions. These white and black references are dependably adjustable and a correction on one reference will result in changing the other reference due to its effect on the histogram's shape.

This office action is NON-FINAL.

Claim Rejections - 35 USC § 112

5. Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the

invention. Claim 22 is indefinite because it is dependent on the canceled Claim 19. It seems Claim 22 should be dependent on Claim 19.

Appropriate correction is required.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 1, 11, 17, 18, 27 and 57 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2, 5, 6, 7, 10, 14, 18 and 19 of U.S. Patent No. 5,754,448 in view of Winkelman (U.S. 5,668,890). Winkelman disclose a

color characterization technique that involves converting first color values into second color values wherein the white reference vector is adjusted using the black reference vector and the first color values (Figure 18; Column 28, Lines 16-52; Column 31, Lines 40-67, Column 32, Lines 1-41; Figures 4-17; Columns 6-28).

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

9. Claims 1, 7, 17, 18, 23, 25-27, 30, 32-34, 41-43, 46, 48, 49, 52, 55, 57 and 58 are rejected under 35 U.S.C. 102(e) as being anticipated by Winkelman (U.S. 5,668,890).

Regarding Claim 1, Winkelman discloses a color characterization method for characterizing a color imaging system (Figures 1, 2, 18-20; Column 2, Lines 43-67, Column 3, Lines 1-48), the method comprising:

generating first color values (R, G, B) in a color coordinate system by using output samples of the color imaging system, the first color values representing colors of the output samples of the color imaging system (Figures 1, 2, 18-20; Column 6, Lines 1-10; Column 28, Lines 16-42); and converting the first color values into second color values (L*, A*, b*) in a device-independent

color coordinate system using a white reference vector and a black reference vector, the white reference vector being adjusted using the black reference vector and first color values (Figures 1-3; Column 6, Lines 1-41; Column 28, Lines 16-67, Column 29, Lines 1-12; Figure 18; Column 31, Lines 40-67; Column 32, Lines 1-41; Figures 4-17; Columns 6-28).

Regarding Claim 7, Winkelman discloses a color characterization method, according to Claim 1, further comprising generating the first color values using at least one of the following: a color measuring device, and a memory (Figures 1, 18-20; Column 28, Lines 37-42; Column 28, Lines 61-67; Column 33, Lines 5-15).

With regards to Claim 17, arguments analogous to those presented for Claim 1 are applicable to Claim 17.

With regards to Claim 18, Winkelman discloses a color characterization arrangement for use in characterizing a color imaging system, comprising:

a computer arrangement, configured and arranged to receive first color values in a color coordinate system, the first color values (R, G, B) representing colors of output samples of the color imaging system (Figures 1, 2, 19 and 20; Column 4, Lines 66-67, Column 5, Lines 1-67; Column 6, Lines 1-10; Column 28, Lines 16-42); and a first memory, responsive to the computer arrangement and configured and arranged to store second color values in a device-independent color coordinate system (Figures 19 and 20; Column 29, Lines 8-12; Column 28, Lines 66-67, Column 29, Lines 1-6; Column 30, Lines 1-6); the computer arrangement being further configured and arranged to convert the first color values into the second color values using a

white reference vector and a black reference vector, the white reference vector being adjusted using the black reference vector and first color values (Figures 1-3; Column 6, Lines 1-41; Column 28, Lines 16-67, Column 29, Lines 1-12; Figure 18; Column 31, Lines 40-67; Column 32, Lines 1-41; Figures 4-17; Columns 6-28).

Regarding Claim 23, Winkelman discloses a color characterization arrangement, according to Claim 18, wherein the computer arrangement is further configured and arranged to calculate the white reference vector using the black reference vector (Figures 2, 19 and 20; Column 29, Lines 53-58; Column 31, Lines 40-54. Reference colors X, Y, Z are calculate based on the reference white.).

Regarding Claim 25, Winkelman further discloses a color characterization arrangement, according to Claim 18, wherein the white reference vector for the device-independent color coordinate system uses white reference tristimulus values to compensate for certain perceptual effects (Column 2, Lines 58-63; Column 6, Lines 1-6; Column 31, Lines 55-67, Column 32, Lines 1-11).

Regarding Claim 26, Winkelman further discloses a color characterization arrangement, according to Claim 18, wherein the computer arrangement is further configured and arranged to: convert the first color values into the second color values using transformations (Figures 1, 2; Column 6, Lines 10-41).

Regarding Claim 27, Winkelman further discloses a color characterization arrangement, according to Claim 18, wherein the device-independent color coordinate system is an L*a*b* color coordinate system (Figure 2; Column 6, Lines 10-41).

Regarding Claim 30, Winkelman further discloses a color characterization arrangement, according to Claim 27, further comprising:

converting the first color values into the second color values using the equations

$$L^* = 116(Y / Yn')1/3 - 16$$

$$a^* = 5\,0\,0\,[\,(X / X'n)\,1/3 - (Y / Y'n)\,1/3\,]$$

$$b^* = 200\,[\,(Y / Y'n)\,1/3 - (Z / Z'n)1/3]\,,$$

wherein

X, Y, and Z are tristimulus values for the first color values, and

X'n, Y'n and Z'n, represent the white reference vector, and adjusting the white reference vector using the tristimulus values (Column 31, Lines 40-67, Column 32, Lines 1-13).

With regards to Claim 32, Winkelman further discloses a color characterization arrangement, according to Claim 18, further comprising a second memory, configured and arranged to provide the first color values to the computer arrangement (Figure 19; Column 28, Lines 53-67, Column 29, Lines 1-7).

With regards to Claim 33, Winkelman further discloses a color characterization arrangement, according to claim 18, further comprising a color measuring instrument, configured and arranged to:

obtain the first color values from a sample; and provide the first color values to the computer arrangement (Figures 1, 2, 18-20; Column 4, Lines 66-67, Column 5, lines 1-67; Column 6, Lines 1-10).

With regards to Claim 34, arguments analogous to those presented for Claim 18 are applicable to Claim 34. Furthermore, Winkelman discloses computer-executable programming inputs of the master analysis unit 8c utilized for preselection of image scope, image gradation and/or color cast (Column 5, Lines 27-32).

With regards to Claim 41, arguments analogous to those presented for Claim 25 are applicable to Claim 41.

Regarding Claim 42, arguments analogous to those presented for Claim 26 are applicable to Claim 42.

Regarding Claim 43, arguments analogous to those presented for Claim 27 are applicable to Claim 43.

Regarding Claim 46, arguments analogous to those presented for Claim 30 are applicable to Claim 46.

Regarding Claim 48, Winkelman further discloses a data storage medium, according to Claim 34, wherein the computer-executable program is further configured and arranged to, when executed, store the second color values in a memory (Figures 19 and 20; Column 29, Lines 8-12; Column 28, Lines 66-67, Column 29, Lines 1-6; Column 30, Lines 1-6).

Regarding Claim 49, Winkelman discloses a color transformation method for performing a color transformation between first and second color imaging systems (Figures 1, 2, 18-20; Column 2, Lines 43-67, Column 3, Lines 1-48), the color transformation method comprising generating first and second color values by using output samples of the first and second color imaging systems, the first and second color values respectively representing colors of the output samples of the first and second color imaging systems (Figures 1, 2, 18-20; Column 6, Lines 1-10; Column 28, Lines 16-42. Scanner 1 and Camera 2 are the first and second imaging systems.); converting the first and second color values respectively into third and fourth color values using a device-independent color coordinate system (Figures 1-3, 18-20; Column 6, Lines 10-56); calculating a black reference vector from a medium on which the output samples are formed and a white reference vector from the black reference vector; adjusting the white reference vector using the first and second color values; and generating color transformation values using the third and fourth color values (Figures 1-3; Column 6, Lines 1-41; Column 28, Lines 16-67, Column 29, Lines 1-12; Figure 18; Column 31, Lines 40-67; Column 32, Lines 1-41; Figures 4-17; Columns 6-28).

With regards to Claim 52, arguments analogous to those presented for Claim 11 are applicable to Claim 52.

Regarding Claim 55, arguments analogous to those presented for Claim 30 are applicable to Claim 55.

Regarding Claim 57, arguments analogous to those presented for Claim 49 are applicable to Claim 57.

Regarding Claim 58, arguments analogous to those presented for Claim 1 are applicable to Claim 58.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 2, 3, 8-11, 14, 16, 20, 35, 36, 50, 51, 59 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winkelman in view of Usami et al (U.S. 5,844,699).

Regarding Claim 2, Winkelman does not explicitly disclose a color characterization method, according to Claim 1, further comprising calculating the black reference vector as a function of a medium on which the output samples are formed. Usami et al disclose a color characterization method, further comprising calculating the black reference vector as a function of a medium on which the output samples are formed (Figure 19; Column 1, Lines 20-36. The black reference vector will be calculated as a function of recording medium characteristics (paper ink absorption).). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to characterize a color imaging system by calculating the color reference

value as a function of recording medium because it will optimize color characterization and provide appropriate combination of colors as a function of output medium.

Regarding Claim 3, Winkelman further discloses a color characterization method, according to Claims 1 and 2, further comprising defining the black reference vector as a vector of zeros (Column 6, Lines 29-31; Column 28, Lines 42-46. By assigning the digital color value zero to absolute black, black color will be addressed by a vector of zero in its binary representation.).

Regarding Claim 8, arguments analogous to those presented for Claims 1 and 2 are applicable to Claim 8.

Regarding Claim 9, Winkelman further discloses a color characterization method according to Claim 8, wherein the white reference vector for the device-independent color coordinate system uses white reference tristimulus values to compensate for certain perceptual effects (Column 2, Lines 58-63; Column 6, Lines 1-6; Column 31, Lines 55-67, Column 32, Lines 1-11).

Regarding Claim 10, Winkelman further discloses a color characterization method according to Claim 9, further comprising:

converting the first color values into the second color values using transformations (Figures 1, 2; Column 6, Lines 10-41).

Regarding Claim 11, Winkelman further discloses a color characterization method according to Claim 8, wherein the device-independent color coordinate system is an L*a*b* color coordinate system (Figure 2; Column 6, Lines 10-41).

Regarding Claim 14, Winkelman further discloses a color characterization method, according to Claim 11, further comprising:

converting the first color values into the second color values using the equations

$$L^* = 116(Y / Yn')1/3 - 16$$

$$a^* = 5\,0\,0\,[\,(X / X'n)\,1/3 - (Y / Y'n)\,1/3\,]$$

$$b^* = 200\,[\,(Y / Y'n)\,1/3 - (Z / Z'n)1/3]\,,$$

wherein

X, Y, and Z are tristimulus values for the first color values, and

X' n, Y' n and Z' n, represent the white reference vector, and adjusting the white reference vector using the tristimulus values (Column 31, Lines 40-67, Column 32, Lines 1-13).

Regarding Claim 16, arguments analogous to those presented for Claims 1, 2 and 7 are applicable to Claim 16.

Regarding Claim 20, arguments analogous to those presented for Claims 2 and 3 are applicable to Claim 20.

With regards to Claim 35, arguments analogous to those presented for Claim 2 are applicable to Claim 35.

With regards to Claim 36, arguments analogous to those presented for Claim 20 are applicable to Claim 36.

With regards to Claim 50, arguments analogous to those presented for Claim 25 are applicable to Claim 50.

With regards to Claim 51, arguments analogous to those presented for Claim 10 are applicable to Claim 51.

With regards to Claim 59, arguments analogous to those presented for Claim 2 are applicable to Claim 59.

With regards to Claim 60, arguments analogous to those presented for Claim 3 are applicable to Claim 51.

12. Claims 4, 5, 21, 22, 37, 38, 61 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winkelman in view of Usami et al (U.S. 5,844,699), and further in view of Van de Capelle et al (U.S. 5,268,754).

Regarding Claim 4, neither Winkelman (explicitly) nor Usami et al disclose a color characterization method, according to Claim 2, further comprising defining the black reference vector using a maximum value in a black color channel of the color imaging system and minimum values in at least one additional color channel of the color imaging system. Van de Capelle et al disclose a color characterization method for characterizing a color imaging system further comprising defining the black reference values using a maximum value in a black color channel of the color imaging system and minimum values in at least one additional color channel of the color imaging system (Column 6, Lines 65-68, Column 7, Lines 1-16. In color space PQRS (CMYK), using the possibility "P=0", "S=100", which corresponds to "C=0" and "K=100".). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize a maximum value in a black color channel of the color imaging system and minimum values in at

least one additional color channel of the color imaging system for defining a reference value for color characterization in a color imaging system because it will provide better printing quality and will optimize the digital color reproduction on the basis of visual assessment of reproduced images.

Regarding Claim 5, neither Winkelman (explicitly) nor Usami et al disclose a color characterization method, according to Claim 2, further comprising defining the black reference vector using maximum values in color channels of the color imaging system. Van de Capelle disclose a color characterization method, according to Claim 2, further comprising defining the second reference values using maximum values in channels of the color imaging system (Column 6, Lines 65-68, Column 7, Lines 1-16. In color space PQRS (CMYK), using the boundary values of "P=100", "Q=100" and "R=100" corresponds to "C=100", "M=100" and "Y=100".). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize the maximum values in channels of the color imaging system for defining a reference value for color characterization in a color imaging system because it will identify the boundary planes of the color gamut and will form a contrast richer image resulting in improved visual assessment of reproduced images.

With regards to Claim 21, arguments analogous to those presented for Claim 4 are applicable to Claim 21.

With regards to Claim 22, arguments analogous to those presented for Claim 5 are applicable to Claim 22.

With regards to Claim 37, arguments analogous to those presented for Claim 4 are applicable to Claim 37.

With regards to Claim 38, arguments analogous to those presented for Claim 5 are applicable to Claim 38.

With regards to Claim 61, arguments analogous to those presented for Claim 4 are applicable to Claim 61.

With regards to Claim 62, arguments analogous to those presented for Claim 5 are applicable to Claim 62.

Allowable Subject Matter

13. Claims 12, 13, 15, 28, 29, 31, 44, 45, 47, 53, 54 and 56 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 63 and 64 are allowed.

Claim 12 recites a color characterization method, according to Claim 11, further comprising:

converting the first color values into the second color values using the equations

$L^* = 116((Y - Ybp) / (Y'n - Ybp))1/3 - 16$

$a^* = 5\,0\,0\,[\,(X - Xbp) / (X'n - Xbp)\,)\,1/3 - (\,(Y - Ybp) / (Y'n - Ybp)\,1/3\,]$

$b^* = 200\,[\,(\,(Y - Ybp) / (Y'n - Ybp)\,)\,1/3 - (\,(Z - Zbp) / (Z'n - Z\,bp))1/3]\,,$

wherein

X, Y, and Z are tristimulus values for the first color values,

X' n, Y' n and Z' n, represent the white reference vector, and

Xbp, Ybp, and Zbp represent the black reference vector; and adjusting the white reference vector using the tristimulus values.

Claim 13 recites a color characterization method, according to Claim 12, further comprising adjusting the white reference vector using the equations

$$X'n = Xb\,(1 - sat(X, Xbp, Xn)) + Xn \cdot sat(X, Xbp, Xn)$$

$$Y'n = Yb\,(1 - sat(Y, Ybp, Yn)) + Yn \cdot sat(Y, Ybp, Yn)$$

$$Z'n = Zb\,(1 - sat(Z, Zbp, Zn)) + Zn \cdot sat(Z, Zbp, Zn)$$

wherein

$$sat(X, Xbp, Xn) = (X - Xn) / (Xbp - Xn)$$

$$sat(Y, Ybp, Yn) = (Y - Yn) / (Ybp - Yn)$$

$$sat(Z, Zbp, Zn) = (Z - Zn) / (Zbp - Zn)$$

Xn, Yn, and Zn are tristimulus values for a perfect white diffuser under standard viewing conditions, and

Xb, Yb, and Zb are tristimulus values for an imaging base associated with the color imaging system.

Claim 15 recites a color characterization method, according to Claim 14, further comprising adjusting the white reference vector using the equations

X' n = Xb (1 - sat (X, Xmax, Xn)) + Xn . sat (X, Xmax, Xn)

Y' n =Yb (1 - sat (Y, Ymax, Yn)) + Yn . sat (Y, Ymax, Yn)

Z' n = Zb (1 - sat (Z , Zmax , Zn)) + Zn . sat (Z, Zmax, Zn)

wherein

sat (X, Xbp, Xn) = (X - Xn) / (Xmax - Xn)

sat (Y, Ybp, Yn) = (Y - Yn) / (Ymax - Yn)

sat (Z, Zbp, Zn) = (Z - Zn) / (Zmax - Zn)

Xn, Yn, and Zn are tristimulus values for a perfect white diffuser under standard viewing conditions, and

Xb, Yb, and Zb are tristimulus values for an imaging base associated with the color imaging system.

Claim 63 recites a color characterization method for characterizing a color imaging system, the method comprising:

obtaining first color values in a color coordinate system using output samples of the color imaging system, the first color values representing colors of the output samples of the color imaging system; and converting the first color values into the second color values in a device-independent color coordinate system using a white reference vector and a black reference vector according to the following equations:

L* = 116((Y - Ybp) / (Y' n - Ybp))1/3 - 16

a* = 5 0 0 [(X - Xbp) / (X' n - Xbp)) 1/3 - ((Y - Ybp) / (Y' n - Ybp) 1/3]

b* = 200 [((Y - Ybp) / (Y' n - Ybp)) 1/3 - ((Z - Zbp) / (Z' n - Z bp))1/3] ,

wherein

X, Y, and Z are tristimulus values for the first color values,

X' n, Y' n and Z' n, represent the white reference vector, and

Xbp, Ybp, and Zbp represent the black reference vector; and adjusting the white reference vector using the tristimulus values.

Claim 64 recites the method of Claim 63, further comprising adjusting the white reference vector using the equations

X' n = Xb (1 - sat (X, Xbp, Xn)) + Xn . sat (X, Xbp, Xn)

Y' n =Yb (1 - sat (Y, Ybp, Yn)) + Yn . sat (Y, Ybp, Yn)

Z' n = Zb (1 - sat (Z , Zbp , Zn)) + Zn . sat (Z, Zbp, Zn)

wherein

sat (X, Xbp, Xn) = (X - Xn) / (Xbp - Xn)

sat (Y, Ybp, Yn) = (Y - Yn) / (Ybp - Yn)

sat (Z, Zbp, Zn) = (Z - Zn) / (Zbp - Zn)

Xn, Yn, and Zn are tristimulus values for a perfect white diffuser under standard viewing conditions, and

Xb, Yb, and Zb are tristimulus values for an imaging base associated with the color imaging system.

Claims 28, 29 and 31 recite the color characterization arrangement for utilization with the color characterization method disclosed in Claims 12, 13 and 15.

Claims 44, 45 and 47 recite the data storage medium for utilization with the color characterization method disclosed in Claims 12, 13 and 15.

Claims 53, 54 and 56 recite the color transformation method for utilization with the color characterization method disclosed in Claims 12, 13 and 15.

The features identified in Claims 12, 13, 15, 28, 29, 31, 44, 45, 47, 53, 54, 56, 63 and 64 in combination with the other elements of the base claims are neither discussed nor suggested by the prior arts of record.

Other prior art cited

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent 5,848,182 to Kanamori is cited for an image forming apparatus correcting the density of image information according the type of manuscript

U.S. Patent 4,926,251 to Sekizawa et al is cited for a color image processing apparatus with image corrector.

U.S. Patent 4,566,798 to Haas is cited for a method for calibrating a reflectometer containing black and white references displaced from the sample position.

U.S. Patent 4,793,313 to Oudshoorn et al is cited for a multilevel scale or composite video to RGBI decoder.

U.S. Patent 5,317,678 to Okawara et al is cited for a method for changing color of displayed images by use of color components.

U.S. Patent 4,698,669 to Sekizawa et al is cited for a color picture reader and method for operating the same.

Contact Information

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mehrdad Dastouri whose telephone number is (703) 305-2438. The examiner can normally be reached on Monday through Friday from 8:00 a.m. to 4:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au, can be reached at (703)308-6604.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 308-9051, (for formal communications intended for entry)

or:

(703) 308-5397 (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703)305-3900.

MD

Mehrdad Dastouri
Patent Examiner
Group Art Unit 2723
May 3, 1999

Jon Chang
Primary Examiner